ABSTRACT OF THE DISCLOSURE

Disclosed herein are (1) a light-emitting semiconductor device that uses a gallium nitride compound semiconductor ($Al_xGa_{1-x}N$) in which the n-layer of n-type gallium nitride compound semiconductor. $(Al_xGa_{1-x}N)$ is of double-layer structure including an nlayer of low carrier concentration and an n⁺-layer of high carrier concentration, the former being adjacent to the i-layer of insulating gallium nitride compound semiconductor $(Al_xGa_{1-x}N)$; (2) a light-emitting semiconductor device of similar structure as above in which the i-layer is of double-layer structure including an il-layer of low impurity concentration containing ptype impurities in comparatively low concentration and an i_{H} -layer of high impurity concentration containing ptype impurities in comparatively high concentration, the former being adjacent to the n-layer; (3) a lightemitting semiconductor device having both of the abovementioned features and (4) a method of producing a layer of an n-type gallium nitride compound semiconductor $(Al_xGa_{1-x}N)$ having a controlled conductivity from an organometallic compound by vapor phase epitaxy, by feeding a silicon-containing gas and other raw material gases together at a controlled mixing ratio.